National Institute of Environmental Health Sciences

Extreme air pollution events from bushfires and dust storms and their association with mortality in Sydney, Australia 1994-2007

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Abstract:

INTRODUCTION: Extreme air pollution events due to bushfire smoke and dust storms are expected to increase as a consequence of climate change, yet little has been published about their population health impacts. We examined the association between air pollution events and mortality in Sydney from 1997 to 2004. METHODS: Events were defined as days for which the 24h city-wide concentration of PM(10) exceeded the 99th percentile. All events were researched and categorised as being caused by either smoke or dust. We used a time-stratified case-crossover design with conditional logistic regression modelling adjusted for influenza epidemics, same day and lagged temperature and humidity. Reported odds ratios (OR) and 95% confidence intervals are for mortality on event days compared with non-event days. The contribution of elevated average temperatures to mortality during smoke events was explored. RESULTS: There were 52 event days, 48 attributable to bushfire smoke, six to dust and two affected by both. Smoke events were associated with a 5% increase in non-accidental mortality at a lag of 1 day OR (95% confidence interval (CI)) 1.05 (95%CI: 1.00-1.10). When same day temperature was removed from the model, additional same day associations were observed with non-accidental mortality OR 1.05 (95%CI: 1.00-1.09), and with cardiovascular mortality OR (95%CI) 1.10 (95%CI: 1.00-1.20). Dust events were associated with a 15% increase in non-accidental mortality at a lag of 3 days, OR (95%CI) 1.16 (95%CI: 1.03-1.30). CONCLUSIONS: The magnitude and temporal patterns of association with mortality were different for smoke and dust events. Public health advisories during bushfire smoke pollution episodes should include advice about hot weather in addition to air pollution.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event, Temperature

Air Pollution: Dust, Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): bush fire smoke

Extreme Weather Event: Wildfires, Other Extreme Event

Extreme Weather Event (other): dust storms

Temperature: Extreme Heat

Geographic Feature: ☒

resource focuses on specific type of geography

Ocean/Coastal, Urban

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory mortality

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified